

two portions, by two half fissures at an angle to each other, one part of the shell representing about one-third of the whole, and the other the remaining two-thirds, as though the tricarpeillary development had not been completed.

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REVIEWS

Coker's *Plant Life of Hartsville, South Carolina**

Although South Carolina was the home of some of the most noted southern botanists of the ante-bellum period, and the scene of much good work by transient collectors as well as by residents in the early days of American botany, when plants were always studied singly, without reference to their associations and environment, it has been sadly neglected by students of the modern science of plant sociology; and fewer descriptions of vegetation have been published for that state than for almost any other in the South. The only paper on South Carolina vegetation at all comparable with the one before us is one by the same author on the Isle of Palms (Charleston County), published about seven years earlier.†

The present paper is a rather detailed study of the vegetation of the immediate vicinity of the town where the author was born and where he has spent many of his vacations since becoming a professor of botany in another state. The area covered does not seem to have any definite boundaries, natural or otherwise. The following condensed outline of the work (which has no table of contents) will indicate its scope about as well as several sentences would.

Introduction (history of exploration) 3-4

Climate 4-7

Topography and geology 7-8

* The plant life of Hartsville, S. C. By W. C. Coker, Ph.D., Professor of Botany, University of North Carolina. 129 pp., 15 plates. $6\frac{1}{2} \times 10\frac{3}{8}$ in. Printed at Columbia, S. C., for the Pee Dee Historical Association, [December] 1912.—Pages 3-38, with the plates, originally published in *Jour. Elisha Mitchell Sci. Soc.* 27: 169-205, *pl. 1-15*. 1912. (Misprinted "Vol. XXVIII, December, 1911.")

† *TORREYA* 5: 135-145, *f. 1-4*. Aug. 1905.

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The numbers in this synopsis refer to the pages of the complete edition. The first 38 pages correspond with the part printed in the Elisha Mitchell Journal, but the wording is not identical in both editions, the author having made a few corrections in the months intervening between the two printings.

Hartsville is in Darlington County, in the upper part of the coastal plain, about 80 miles from the coast and 15 or 20 from the fall-line. According to Dr. Coker it is just at the coastward edge of the fall-line sand-hill belt. The soils in that neighborhood are mostly sandy, with little mineral plant food, and rocks, especially limestone, are conspicuous by their absence. The streams are not muddy, and the location of a paper-mill there (mentioned several times in the text) is probably correlated with the comparative freedom of the water from mineral substances in suspension or solution.

The mean temperature (deduced mainly from the records of two stations in the same county) is about 61.5° F., and the average annual rainfall about 48 inches. About 36.6 per cent. of the total precipitation occurs in the three warmest months, June to August, and 44.7 per cent. in the four warmest months, June to September. (This preponderance of summer rainfall—

which the author does not comment on—seems to be characteristic of all the sandier parts of the coastal plain of the southeastern United States, and it must have an important influence on soil and vegetation.*

The descriptions of vegetation seem to have been written more for the benefit of the intelligent citizens of Hartsville than for the scientific public, for they contain very few generalizations, or comparisons with other parts of the world. A number of particular spots, many of which have been considerably altered by civilization, are described in a sort of narrative style (as was customary in most of the pioneer descriptions of vegetation, a generation or so ago), without any tabulation, or summation of the salient features of the vegetation of each habitat. However, the inconvenience of having the names of plants scattered through the text in no particular order is partly offset by the index, which seems to be nearly complete.

The sand-hill vegetation, the first type described, is evidently much like that of the rest of the fall-line sand-hill belt from North Carolina to Georgia, of which almost no ecological descriptions had been published before.† Under this head there are some valuable notes, partly compiled and partly original, on the relations of fire to the dominant tree of the sand-hills, *Pinus palustris*.

The upland forests of slightly richer soils differ from those of the sand-hills in having more shade and humus, and many more species of trees. The author calls especial attention to the scarcity of conspicuous spring flowers in these forests: a feature which is also characteristic of the hammocks of Florida and of many other places where the soil is sandy and poor in soluble minerals and the summers are wetter than the winters, and has been commented on by many visitors to such regions coming from places where different conditions prevail.

The "flatwoods" resemble the flat pine-barrens nearer the coast in many ways, and the "savannas" seem from the descrip-

* See Bull. Torrey Club 37: 415-416 (footnote). 1910.

† Some of the commoner or more conspicuous plants of this belt have been listed in Bull. Torrey Club 37: 412-413. 1910; 38: 224-225. 1911.

tion to be much like the cypress ponds farther south, having more trees and perhaps more water in them than the typical savannas of eastern North Carolina and tropical America.

A "bay"* may be defined roughly as a two-storied forest growing in permanently saturated soil, with a large proportion of evergreens in the lower story, which is usually denser than the upper. Dr. Coker notes the resemblance of his bays to the pocosins of eastern North Carolina, and divides them into two classes, differing considerably in vegetation; namely, flatwoods, or stagnant bays, and "alluvial" or drained bays. His application of the term *alluvial* is somewhat at variance with ordinary usage, and his "alluvial bays" are very similar to some of the *non-alluvial* swamps of the coastal plain of Georgia and Florida.

The absence of muddy (alluvial) swamps characteristic of large fluctuating streams is commented upon. The creek-swamps are much like those of the Altamaha Grit region of Georgia. The "lakes" and ponds are all artificial, and therefore have little geographical significance, but the plants growing in them are nearly all indigenous somewhere in the coastal plain, if not in that immediate vicinity.

The list of 52 "native trees" includes some large shrubs like *Alnus*, *Sassafras*, *Prunus angustifolia*, *Cyrilla* and *Kalmia*, and some doubtfully indigenous species like *Populus deltoides*, *Juglans nigra*, *Celtis Smallii*, *Morus*, *Sassafras*, *Platanus*, *Prunus serotina*, *P. angustifolia*, *Gleditsia*, *Diospyros* and *Catalpa*; but at the same time the author shows a commendable conservatism in relegating to the list of cultivated trees *Juniperus*, *Fagus*, † *Quercus laurifolia*, *Ulmus alata*, *Prunus caroliniana*, and *Chionanthus*, which are believed to be native not many miles away. In the list of native trees just one fourth of the species (six conifers and seven angiosperms) are evergreen; and the proportion would be somewhat larger if the doubtful species above

* The use of *bay* as a term in plant sociology seems to be strictly confined to the coastal plain, like *hammock* and *pocosin*.

† It is very interesting to know that the beech is absent from the Hartsville neighborhood, as it is from the Altamaha Grit region of Georgia, which has equally sandy and sour soils. See Bull. Torrey Club 32: 147. 1905; TORREYA 6: 199; Ann. N. Y. Acad. Sci. 17: 106, 330. 1906.

mentioned were excluded, and very much larger if the vegetation were analyzed quantitatively instead of qualitatively. (Evergreens, both coniferous and broad-leaved, in temperate and moderately humid climates at least, seem to be especially characteristic of coarse or poor or sour soils.)

The taxonomic catalogue, which makes up nearly half the book, includes 628 species of pteridophytes and spermatophytes, native and naturalized. Less than 20 per cent. of the angiosperms are monocotyledons, which is a striking confirmation of the statement in a footnote on page 62 that the list is not complete for grasses and sedges. (Only three species of *Cyperus*, four of *Rhynchospora*, and one of *Carex* are enumerated.) Most other parts of the coastal plain seem to have about 30 per cent. of monocotyledons in their angiospermous flora.*

In nomenclature (and classification) Dr. Coker has followed as far as possible the seventh edition of "Gray's Manual," because it is "the most available [*sic*] and conservative book." As his locality is about 150 miles south of the territory covered by the Manual, there are many species and even genera in his flora which are not included in that book, and he has been led into many nomenclatorial inconsistencies by trying to follow it and the current southern floras at the same time. In attempting to reduce the number of these inconsistencies he has made one new combination, *Euphorbia exserta* (of which systematists will take due notice), and suggested another, *Oenothera arenicola*. (Both of these species were originally described by Small under genera which have never been recognized by Gray and his direct successors.)

There are a few cases where species seem to have been wrongly identified. *Arundinaria macrosperma*, characteristic of the banks of large muddy southern rivers, is hardly to be expected in that kind of country, the "*Nymphaea advena*" is probably one of the floating-leaved species, the "*Euphorbia maculata*" of the sand-hills is probably *E. cordifolia* (for *E. maculata* is a typical roadside and railroad weed), and the "*Viburnum cassinoides*" may be *V. nitidum*.

* See TORREYA 5: 207-210. 1906; 11: 41. 1911; 12: 224. 1912.

More interesting is the case of the cypress. Dr. Coker avoids mentioning the technical name of this tree in the first 33 pages, and then in the four places where he does designate it specifically he calls it *Taxodium distichum*. On page 44 he implies that the only difference between our two eastern species (or varieties, as some still prefer to call them) of *Taxodium* is in the leaves; thus completely ignoring the differences in bark, buttresses and habitat pointed out by the reviewer in one of our best-known botanical journals in 1902 and 1905. The tree shown in his plate 12 is easily identified by its bark and surroundings as *T. imbricarium* (or *T. ascendens*, according to the Vienna rules of nomenclature); and one cannot be certain from his descriptions of the vegetation that typical *T. distichum* occurs there at all.

The notes on the distribution of each species average not more than two lines each. Assuming the index to be complete, it appears that over 40 per cent. of the species listed are not mentioned in the ecological part of the work, so that we are given very little information about their habitats and associations. Many of these 40 per cent., however, are weeds, which the author did not undertake to classify by habitat.

This work, especially the systematic part of it, is one of many recent examples that go to show how few people there are in the world at the present time who can write about a large number of plants and name them all correctly. The accurate determination of plants seems to be gradually becoming a lost art, and botanical text-books have almost ceased giving instructions in it. The ranks of the systematists are being decimated by desertion and death, and there are very few new recruits these days. (Even the present reviewer, who used to be primarily a systematist, has lost interest in nomenclatorial refinements, and now cares little for minute specific characters which are not visible from a moving train.)

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Blakeslee and Jarvis' Trees in Winter*

The title *Trees in Winter* suggests for the book under con-

* A. F. Blakeslee and C. D. Jarvis, *Trees in Winter: Their Study, Planting, Care, and Identification*, pp. 1-466. [Illust.] The Macmillan Company, New York. Price \$2.00.